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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,667	12/21/2001	Takashi Iizuka	P21408	6315

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RESTON, VA 20191

EXAMINER

ALLEN, DENISE S

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 01/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/023,667

Applicant(s)

IIZUKA, TAKASHI

Examiner

Denise S Allen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

✓ The disclosure is objected to because of the following informalities: the phrase “when they area incident on the light receiving element” (page 14 lines 2 – 3) is unclear. Suggested correction: replace the word “area” with “are”.

Appropriate correction is required.

Claim Objections

✓ Claims 5 and 6 are objected to because of the following informalities: the limitation “refractive lens” (claim 5 lines 3 and 7, claim 6 line 3) is unclear because it is not certain whether or not this limitation refers to the previously recited “refractive lens element”. Suggested correction: replace the limitation “refractive lens” with “refractive lens element”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 3, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa.

Regarding claim 1, Ishikawa teaches a scanning optical system (Figures 1 and 2) used for exposing a predetermined imaging area (column 4 lines 9 – 13) on a surface (reference A) to be scanned to a plurality of laser beams (column 4 lines 4 – 8), comprising: a plurality of light

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sources (references 12 and 14) that emit a plurality of laser beams (references 12a and 14a) having different wavelengths (column 4 lines 43 – 51), respectively; a single deflector (reference 20) which deflects the plurality of laser beams simultaneously (references 12a, 14a, and L); an imaging optical system (references 22, 24, 26, and 52) that converges the plurality of laser beams deflected by said single deflector on the surface to be scanned (column 6 lines 14 – 25 and 31 – 34); and a beam detector (reference 56) that receives the plurality of laser beams directed to outside of the predetermined imaging area via at least one of lens elements (references 22 and 52) included in said imaging optical system, a synchronizing signal being generated upon detection of each of the plurality of light beams by said beam detector (column 6 lines 26 – 30), an optical characteristic of said imaging optical system being configured such that the laser beams directed to said predetermined imaging area are aligned in a scanning direction (column 6 lines 42 – 59 and Figure 3a), while the laser beams directed to said beam detector are shifted in the scanning direction (which do not intersect reference 26 and are not adjusted).

Regarding claim 2, Ishikawa teaches said single deflector (reference 20) comprises a polygonal mirror having a plurality of reflecting surfaces (column 4 lines 55 – 56), one of said plurality of reflecting surfaces reflecting the plurality of laser beams at each scan (column 6 lines 4 – 9), said polygonal mirror being rotated so that the laser beams reflected by said reflecting surface scan.

Regarding claim 3, Ishikawa teaches said beam detector comprises a single light receiving element (reference 56), each of the plurality of laser beams being incident on said single light receiving element (column 6 lines 26 – 30).

Regarding claim 7, Ishikawa teaches a scanning optical system (Figures 1 and 2) used for exposing a predetermined imaging area (column 4 lines 9 – 13) on a surface (reference A) to be scanned, comprising: a plurality of light sources (references 12 and 14) that emit a plurality of laser beams (references 12a and 14a) having different wavelengths (column 4 lines 43 – 51), respectively; a single deflector (reference 20) which deflects the plurality of laser beams simultaneously (references 12a, 14a, and L); an imaging optical system (references 22, 24, 26, and 52) that converges the plurality of laser beams deflected by said single deflector on the surface to be scanned (column 6 lines 14 – 25 and 31 – 34); and a beam detector (reference 56) that receives the plurality of laser beams directed to outside of the predetermined imaging area via at least one of lens elements (references 22 and 52) included in said imaging optical system, said imaging optical system has a first range (the part of reference a that does not intersect reference 54) and a second range (the part of reference a that intersects reference 54) along a scanning direction (reference a), the laser beams directed to said imaging area passing through said first range, the laser beams directed to said beam detector passing through said second range, said imaging optical system being configured such that , within said first range, a lateral chromatic aberration of said imaging optical system being compensated for (Figure 3a), and that within said second range, a lateral chromatic aberration resides so that the plurality of laser beams are separated from each other in the scanning direction thereof.

Regarding claim 8, Ishikawa teaches an optical characteristic of said imaging optical system, within said first range, is configured such that a plurality of beam spots respectively formed by the plurality of laser beams within said imaging area are aligned in the scanning

direction (Figure 3a), while the plurality of laser beams are incident on said beam detector at different timings.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa in view of Kondo.

Regarding claim 4, Ishikawa teaches a scanning optical system as described above. Ishikawa further teaches the imaging optical system includes at least one refractive lens element. Ishikawa does not teach the imaging optical system also including a diffractive lens structure formed onto said refractive lens element so that said imaging optical system exhibits said optical characteristic.

Kondo teaches a scanning optical system (Figure 2a) with an imaging optical system (references 3a, 6, and 9) that includes at least one refractive lens element (reference 3a and 6) and a diffractive lens structure (reference 9) formed onto said refractive lens element (Figure 5 references 23a and 23b). It would have been obvious to one of ordinary skill in the art at the time of the invention to form the diffractive lens structure of Kondo on a refractive lens element of the imaging optical system of Ishikawa in order to reduce the chromatic aberration of the imaging optical system (Kondo column 2 lines 31 – 51).

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Regarding claim 5, Kondo teaches the diffractive lens structure is formed in a predetermined area on a surface of a refractive lens (Figure 3b).

Regarding claim 6, Kondo teaches the diffractive lens compensates for a lateral chromatic aberration of at least on refractive lens element (column 2 lines 47 – 49).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise S Allen whose telephone number is (703) 305-7407. The examiner can normally be reached on Monday - Friday, 8:30am - 5:00pm.

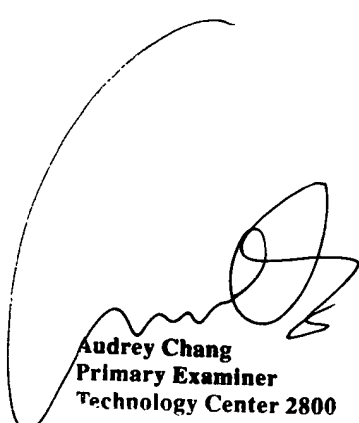
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on (703) 308-1687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Denise S Allen
Examiner
Art Unit 2872


dsa

January 21, 2003


Audrey Chang
Primary Examiner
Technology Center 2800